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A.D. 1887, 16th AUGUST. N° 11,208.  
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COMPLETE SPECIFICATION.

**Improvements in Corsets or Stays Designed more Especially for
the Relief of the Deformed or Crippled.**

I, MILTON JOSIAH ROBERTS (Physician and Surgeon) of 105, Madison Avenue in the City, County and State of New York, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

5 My Invention relates to corsets or stays for the support of the human body. It is designed especially to support the body and relieve the suffering of the deformed and crippled. It is also well adapted to the support of the body in all instances where corsets are or may be advantageously worn.

To this end it is made of wire. The corset is of peculiar construction and is made
10 in a peculiar manner to adapt the same to the uses for which it is intended. Wire corsets have heretofore been made from wire gauze in the form of sheets, from which sheets sections have been cut in accordance with certain patterns, which sections in turn have been moulded or stamped in such a manner as to approximately fit the contour of the body to which they are to be applied. These pieces of wire gauze, cut
15 in accordance with a special pattern, are soldered or otherwise fastened together so as to form a corset. Corsets have also been made out of woven fabric in the form of a sheet in which the threads running in one direction were wire, and those running at right angles were of other material. From such sheets sections are cut and swedged up or otherwise brought into the form of a corset.

20 In my invention I do not use an already woven fabric, nor stamp or otherwise work into form, sections from the same. The distinctive feature of my corset is that it is woven over a form into curvilinear contour out of wire strands.

One of the ways in which my corset may be constructed is as follows:

First of all, a model is required. If the individual for whom the corset is intended
25 be deformed, a mould of the body is taken in plaster or other substance, and from this mould a cast is made; over this cast or form the corset is woven. By referring to Figure 5 which illustrates one of my corsets partially constructed, a good general idea will be obtained of the mode of its construction.

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Prior to commencing to weave the corset over the cast or form A, Figure 5, said cast or form is marked or laid off as required according to the desired depth and height of the corset and the number of segments of which it is to be composed, or into which it is to be divided.

The next step is to place upright and oblique stays, $b b^1$, Figure 5, upon the cast or form in such positions or position, and of such strength and width as are desired. These are secured in position by binding or otherwise attaching them to the cast or form. B, Figure 5, is the marking on the cast indicating the limit of the lower margin of the corset.

Instead of using stays cut from sheet metal, linear segments of closely woven wire mesh, see Figure 9, a^1, b^1, c^1 , may be constructed, during the process of weaving along lines where it is desired to stiffen the corset, or such strips may be previously woven and placed in position on the cast.

In weaving the corset, the wires are intertwined as shown in Figures 5 and 11, commencing at the marginal wire f , Figure 5. 15

In all instances, the contour of the corset corresponds to that of the cast or model A, Figure 5, over which it is woven, and the meshes lie in the planes of adaptation to the body. When only two twists are given, as at a Figure 11, the meshes of the corset as thus woven may be crowded together to a less transverse dimension in the same plane as shown at b Figure 11. This is a distinctive feature of my corsets woven as described. When a greater number of twists are made, three for instance, as at c , Figure 11, the meshes are more permanent, it being difficult or impossible to crowd them into less transverse dimensions. 20

Sometimes, it is desirable to make ten or more twists of the strands of wire corresponding to a zone encircling the smallest part of the waist, as shown at d , Figure 11, and in Figures 2, 3, 4, 6, 10 and 12. When the corset is thus constructed a belt of ribbon or other fabric, provided with a buckle, may be interlaced between these elongated meshes so as to form a girdle around the waist which can be tightened in accordance with the pleasure of the wearer. 25

In the process of weaving the corset, in passing from the upper or expanded part, of the corset, to the waist or the smaller circumferential measurement of the corset, and again to the lower or bulging part, corresponding to the hips, if the same number of strands of wire were used throughout, the meshes would necessarily be very coarse in the expanded portion and very small in the waist portion of the garment. To avoid this and to secure uniformity in the size of the meshes in passing from the enlarged upper portion of the corset to the smaller waist portion, a certain number of wires are cut out and the cut ends twisted around the remaining wires, as shown in Figure 5, at m . In proceeding from the waist part of the garment down over the pelvic or hip portion, additional strands of wire are incorporated as may be required to maintain the uniformity in the size of the mesh as shown at n , Figure 5. 30 35 40

In the process of weaving when the lower margin of the corset is reached each alternate strand may be cut off. Those that remain may be woven or twisted together so as to form a margin corresponding to the lower border of the corset, as indicated by the markings on the cast or form over which it is being woven, see x Figure 9, which shows the lower margin of the corset as it appears at a point from which the binding of the corset is represented as cut away. It should be stated that it is desirable, in weaving one of my corsets with a twisted mesh, to make use of wire which has been thoroughly annealed or softened. By so doing these strands of wire are readily formed into a mesh which accurately fits the model and which retains its form when removed from the model. The wire is more or less tempered by the process of weaving. 45 50

Sections of the corset may be made so as not to yield to transverse pressure, not only by increasing the number of twists of the strands of wire as already described, but also by varying the pattern of the mesh, as for instance, by using that pattern of mesh shown at E, Figure 5 and D Figure 13. 55

Other patterns of mesh available for various purposes are shown in Figure 13 at A, B, D.

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Woven into form out of wire strands as described, the corset or curvilinear body brace will not only retain its shape, but the resiliency in different parts of the garment may be increased or diminished as required.

A distinctive feature of this corset which has already been alluded to, viz.: the weaving of its meshes *a* Figure 11, so that they may be crowded together as shown at *b*, Figure 11, is especially serviceable when using the corset for the correction of certain bodily deformities, as for instance in rotary lateral curvature of the spine. To understand how this is done, it will be necessary to refer to Figure 7 and Figure 8, which represent plaster casts. Figure 7 is a back view of the body of a patient with rotary lateral curvature of the spine. An undue prominence exists at *b*, in the region of the right shoulder, and at *c* in the left lumbar region; an abnormal sinking in of the body exists at *a* and *d*. The part above the left hip *e* is too prominent, while that above the right hip *f*, sinks in too much.

Figure 8 shows a back view of the same cast after these abnormalities have been corrected as follows: The abnormal prominence of the right shoulder *b* has been cut down and the corresponding depression under the left shoulder *a* has been filled up. Likewise, the undue prominence in the left lumbar region at *c* has been cut away, while the corresponding depression in the right lumbar region at *d* has been filled up. Furthermore, the projection above the left hip *e* has been cut away, while the depression above the right hip *f* has been filled up. The cast is thus materially improved in form and symmetry in the parts of the body above the hips. Now over this corrected cast a corset is woven, as already described.

When the corset which is woven over the corrected cast is applied to the person of the deformed individual, as represented in the deformed cast Figure 7, it will be seen that a corrective pressure must necessarily be exerted upon the abnormally prominent parts, while those parts which are depressed will not be pressed upon unduly, or at all, in consequence of the concavities in the cast at these points, having been filled up prior to the weaving of the corset over the cast. Now if, the pattern of the mesh which is used, is such as will permit of the meshes being crowded together, as at *b* Figure 11, a still further corrective action upon the abnormally prominent parts may be exerted in the following manner.

The corset having thus been completed and removed from the cast or mould, it will be found that by making transverse pressure, the meshes between any two perpendicular stays can be crowded together in any part of the garment into less transverse dimensions, as already described.

Now, by sewing or otherwise attaching a strip of elastic fabric or webbing *c*² and *b*² Figure 10, and *c*² and *b*² Figure 12, to the corset between any two upright stays, the said webbing or other elastic device will automatically crowd together the meshes of the corset, which, when applied to the body, will exert corrective action, as already described.

In order to prevent the possibility of crowding the meshes together over abnormally depressed parts of the body as at *a* and *d* Figure 7, and thus interfere with their development, I may, when the corset has thus been woven, make use of cross or obliquely transverse stays as at *y* and *a*² Figure 12.

These stays may overlie, and be secured to the meshes of, the corset by a wire or other device as shown at *b*¹ Figure 5, and extend from one upright stay to another to which they are riveted or otherwise fastened, or they may be woven in the corset as at *b*¹ Figure 5, as heretofore mentioned.

Sometimes, owing to the weakness and extreme emaciation of the patient, or for other reasons, it is not desirable to exert any pressure upon abnormally prominent parts further than that which is essential to the support of the body. In other words, the aim of the use of the corset in such instances is, not to exert a corrective action on the abnormal prominence, but simply to afford support sufficient to make the patient comfortable. To this end, an exact cast of the body, as shown in Figure 7 is made. Over this a corset is woven.

In making use of my invention I may use round, flat, or any other shaped strands of wire composed of any kind of metal. Said strands of wire or substitutes therefor,

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may be plain, or may be covered with thread or other material, or may be plated with any other metal, or covered with a protective coating.

The corset may be of different shapes and of different patterns, according to the requirements of the case.

Figure 5 shows one of my corsets partially constructed, with pendant strands of 5 wire not yet woven into a mesh to fit the contour of the body.

Figure 1 shows a form of corset constructed in one piece as a body brace.

Figures 2 and 3 show a form of corset for a young or adult female, designed as a guide to the cultivation of a perfect form.

Figure 4 shows a form of corset made in three sections, adapted to the wants of a 10 hump back patient or one affected with "Potts'" disease of the spine. In corsets of this pattern constructed for a patient with "Potts'" disease, it is sometimes desirable to weave the posterior segment of the corset of a pattern of mesh shown at E Figure 5, which cannot be crowded into less transverse dimensions than that occupied at the time of weaving. In this way pressure on the projecting lump is 15 avoided, no matter how tightly the corset may be drawn about the body.

Figure 6 is a corset woven in two segments to be worn by a patient with an exaggerated deformity in the region of the right shoulder, resulting from rotary lateral curvature of the spine. It is designed only to render a sufficient amount of support to relieve the discomfort of the patient, and does not aim at exerting a 20 corrective pressure on abnormally prominent parts, having been woven over a cast which exactly corresponds to the contour of the body.

Figure 7 shows a back view of a plaster cast of a deformed body.

Figure 8 shows a back view of the same plaster cast after the abnormalities have 25 been corrected, as already described.

At a^1 , b^1 , c^1 , Figure 9 is illustrated a modified form of stay.

Figure 10 is a back view of a corset applied to a corrected cast over which it has been woven, and provided with transverse stays and broad pieces of elastic webbing designed to exert a corrective action on abnormally prominent parts when applied to 30 the body.

Figure 11, a , b , c , d , illustrates the appearance of different meshes.

Figure 12 illustrates a corset similarly constructed to that shown in Figure 10, but opened out so as to show more perfectly the extent and direction of the cross stays a^2 , d , x , and y .

A considerable number of patients have spinal deformities so severe that it is 35 impossible to overcome or even lessen them materially. Two indications for treatment present themselves in such cases. First, to relieve the suffering of the patient by rendering him efficient support. Second to give him, when dressed in ordinary attire, as symmetrical a form as possible in order that he may not attract undue attention by the conspicuousness of his deformity. To this latter end, after 40 having applied a spinal corset, it is customary to apply pads of varying thicknesses and sizes over the abnormally depressed parts of the body outside of the apparatus used for spinal support, in order to give the appearance of a symmetrical form when the patient is clothed. These pads are not only hot and uncomfortable, but they also absorb the perspiration of the body and soon become filthy. Moreover, 45 they are continually changing their form. To overcome these serious objections, I resort to the following method in constructing one of my wire corsets.

An exact cast of the body as shown at Figure 14, is made. Over this case a skin-fitting knit shirt is drawn. Plaster of Paris mixed with water, or some other substance that can be readily moulded, is now used to fill up the undue depressions 50 of the body so as to make the cast appear as symmetrical as possible, see Figure 15. Having done this, the shirt is cut down in front and removed with the newly-constructed pad or pads of plaster. We are now ready for the weaving of the corset, which is proceeded with over the original cast after the manner already described in detail. Before or after removing the corset from the cast or mould over which it has 55 been woven, a pad or pads of plaster modelled on the outside of the shirt as described and which give the appearance of greater symmetry to the form, are now placed in

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their respective positions over the wire corset, as shown at Figure 16. With these pads in place a mesh woven out of separate strands of wire is constructed to correspond to the external contour of the plaster or other pad. Subsequently the plaster pad is removed from its position on the outer surface of the wire corset, and
 5 the margins of the section of wire mesh corresponding to the external contour of the aforesaid pad are secured or made fast to the original corset. There results, as can be readily understood, a space between the original corset which exactly fits the contour of the body and that part of the garment which corresponds to the external contour of the pad, and which restores the symmetry of the body, when the corset is
 10 applied to the person and the patient is attired in ordinary clothing, see Figure 17. In this manner the hot, uncomfortable pads which are ordinarily used under the clothing to restore the symmetry of deformed bodies are done away with, and we have a cool and hygienic garment instead thereof. Wire pads similarly constructed and designed to increase the apparent breadth of the hips, may be attached directly to
 15 the corset as already described for pads intended for improving the appearance of deformed backs. When dealing with patients who have undeveloped mammae, wire pads of appropriate size and contour may be attached in proper position directly to the corset in front.

It is sometimes desirable, in addition to supporting the spine proper, to render
 20 more or less support to the head, or to one or both of the upper or lower extremities, see Figure 18, which represents a head-rest attached to a wire corset, and Figure 19 which represents a hip-splint attachment incorporated in a wire corset. In such cases the shafts to which the head support, hip-splint, or other apparatus is attached, are incorporated in the meshes of the spinal corset during the process of weaving it over
 25 a mould of the patient's body, or else are subsequently attached to the outside of the corset. Instead of commencing to weave a corset as already described, viz. : from a line corresponding to the upper margin of the corset, the weaving may be proceeded with at right angles to the perpendicular axis of the body, as shown in Figure 20.

Again, a corset may be constructed out of wire strands in the following manner.
 30 Figure 21 is a plan view of a wire braiding machine in part, the same only showing so much of the machine as is necessary to explain another method of constructing a wire corset directly out of wire strands. Figure 22 is a side elevation upon a larger scale representing the core of a wire braiding machine, said core varying in diameter and contour. Machinery for raising and lowering the pedestal upon which the core
 35 is placed during the process of covering it with a braided wire mesh is also shown in this Figure. Constructing the corset after this method, I use, it will be seen, in combination with a wire braiding machine, a core of varying diameter and contour, and of such a size and shape that its external configuration represents the form, size, and contour, which it is desired that the braided wire mesh shall permanently retain
 40 when removed from said core.

It will be seen also that I make use of a movable pedestal upon which said core is placed, and of a mechanism for raising and lowering said pedestal, together with means for maintaining in the desired horizontal plane the series of wire strands as the core over which they are being braided is moved up or down. Also the means
 45 of varying at will the rate of speed of raising pedestal or core, thereby rendering it possible to vary the size of the mesh in passing over different portions of the core.

Furthermore, the production of corsets by this method is facilitated by the use of clasps, which are so placed over the braided wire mesh as to press it against the core so as to prevent any distortion of the mesh until its permanency has been secured.
 50 Heretofore, braiding has been done over a long slightly tapering core, from which the fabric braided thereon was afterwards removed and made into various articles of manufacture, or it has been braided over a collapsable cylindrical core of considerable length, or it has been braided over a permanent tapering core from which the braided wire cylinder automatically shuffles off as the braiding proceeds. The cylinder
 55 of wire resulting from these methods of braiding is subsequently made up into various articles of manufacture.

Now, instead of following the method already indicated, the wire may be braided

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directly over a core, the surface of which accurately corresponds to the form and external configuration of the part of the body to which the completed garment is to be applied, or over a core of any other form which it is desired that the completed article of manufacture shall permanently retain. These cores may be made of any material, their distinctive feature being that they are of a form, size, and contour, which it is desired that the plaited or completed article shall maintain when removed from them. 5

C, Figure 22, represents the pedestal upon which the core rests. This pedestal is capable of being raised and lowered at pleasure. It is shown in relation with machinery suitable for varying at pleasure the speed with which it is raised or lowered. 10

A, Figures 21 and 22, is a circular framework which I make use of to press down upon the wires when desired, during the process of braiding, in order to prevent their being carried to a higher level as the core is gradually shoved up. At *c*, Figure 22 the tightly drawn wire strands passing from the spools at the periphery of the wire braiding machine are shown. 15

D, Figure 23, represents a clasp placed over the wire at the end of the core so as to press the wires at this point firmly against the core and thus temporarily secure the permanency of the braided meshes. This clasp is to remain in position until the permanency of the meshes has been secured by other means. 20

When the successive zones of the core have been passed up through the circular frame work beyond the level of the horizontal strands of wire *c*, another clasp similar to that represented at D Figure 23, is placed about the core at its lower end which in turn presses the wires on this level firmly against the core.

Another core is now placed in position on the pedestal and brought up so that its upper end presses against and more or less accurately coincides with the lower end of the first core. The braiding is now proceeded with, until the upper end of the second core has been covered with the braided mesh. 25

A third clasp similar to that represented at D Figure 23, is now placed over the wires at the upper end of the second core which secures them firmly in place. 30

A circumferential division of the cylinder of braided wire can now be made between the clasps which have been applied to the lower end of the first core and the upper end of the second core. After such division, the first core with the braided wire mesh, secured in position by clasps at its upper and lower ends, may be removed, see Figure 23. This operation is repeated for each core in succession. 35

When the permanency of the meshes has been secured by the soldering of the wires at their intersection, or by other means, the clasps may be removed and a longitudinal division of the wire cylinder made so as to permit of its removal from the core; or a collapsable core having the external configuration desired may be used.

The pedestal C carrying the core may be raised as described by means of a screw *f*, operated by bevel gears *g*, *h*, and a varied raising speed be given to vary the size of the mesh and the discharge of the wire for the different portions of the core, by means of reversed cone pulleys *i*, *k*, connected with a shifting belt *l*, or any other suitable means may be employed to produce these motions of the pedestal and core. 40

The model, Figure 23, covered with an interbraided wire mesh which is secured to the model at its upper and lower ends by clasps, see Figure 23, is now immersed in tin or other molten metal. In consequence of this the strands of wire at their intersection are soldered together as shown in Figure 24, which secures the permanency of the contour of the garment. 45

Stays provided with the ordinary corset fastenings, and of appropriate length, are secured to the external surface of the corset, either before or after the dipping of the corset in molten metal, as indicated at *c c*, Figure 24. Additional stays *c*² at the side as shown in Figure 25, may likewise be secured in the same manner. 50

The braided wire cylinder or body brace is now divided longitudinally between the two stays in front, or the two stays behind, or along any other line or lines desired. Before doing this, however, the part of the braided wire cylinder or pad which projects above the dotted line X in Figure 23 indicating the upper margin of the corset, may 55

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be trimmed off. The same process is repeated for the lower margin of the corset. The corset is now complete, subject of course to any after trimming, covering, or attachment of fastenings to hold the divided corset or sections together when on the person.

- 5 The corset may be plated with nickel or other metallic substance. The upright stays as well as the margins of the corset can now be covered or bound with suitable material, or each section of the corset may be entirely enveloped inside and outside by a non-metallic textile fabric *g*, Figure 25, of fine mesh so as to almost if not quite exclude from view the wire or stays of which it is composed.
- 10 By this method of manufacture I am enabled to produce a wire corset which is easily made, and is both light and resilient, and conforms exactly to the shape of the bust or figure of the person, the wires composing the meshes of the corset being applied to the form as pliable threads, while the subsequent soldering of them at the points of intersection serves to hold them in place and the corset in form.
- 15 In all of the modifications shown it will be perceived that the body of the corset is constructed directly out of strands of wire interlaced or woven into the form of a corset, the resulting fabric being of the desired contour, permanency of form, and resiliency.

Having now particularly described and ascertained the nature of the said Invention
20 and in what manner the same is to be performed, I declare that what I claim is:—

1. The improved method of making corsets or body braces, which consists in arranging and fastening together separate strands of wire to form a fabric corresponding to the contour of the body, substantially as set forth.
2. A corset or body brace, made out of separate strands of wire arranged to conform
25 and correspond to the curvilinear contour of the body, and fastened together at intervals in such a manner that the resulting fabric retains its curvilinear contour, substantially as set forth.
3. A corset or body brace made out of separate strands of wire arranged and formed curvilinearly to correspond to the contour of the body, and fastened together at
30 intervals so that the resulting fabric retains its curvilinear form, said corset comprising stays or strips incorporated in or connected to the fabric to modify its resiliency in certain directions, substantially as set forth.
4. A corset or body brace made out of separate strands of wire arranged and formed curvilinearly to correspond to the contour of the body, fastened together at
35 intervals, said strands varying in number in accordance with the extent of the surface of the body to be covered, in such a manner that the resulting meshes approximate uniformity of size, substantially as set forth.
5. A corset or body brace of curvilinear contour, composed of intertwisted strands forming meshes which lie in the planes of adaptation to the contour of the body,
40 substantially as described.
6. A corset or curvilinear body brace, composed of intertwisted strands forming meshes which lie in the planes of adaptation to the contour of the body, the said meshes having a greater number of twists in some parts of the corset than in others, to modify the resiliency of different parts of the same, substantially as shown and
45 described.
7. A corset or curvilinear body brace, composed of strands of wire fastened together forming meshes which lie in the planes of adaptation to the contour of the body, said corset having in different parts meshes of different pattern for modifying the strength, permanency of contour, and resiliency of different parts of the same, substantially as
50 set forth.
8. A corset or curvilinear body brace, composed of intertwisted strands forming meshes which lie in the planes of adaptation to the contour of the body, combined with means for exerting an independent tension upon certain parts of said corset, whereby the meshes are crowded together substantially as described.
- 55 9. A corset or curvilinear body brace, composed of intertwisted strands forming meshes which lie in the planes of adaptation to the contour of the body, in combination

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with stays to secure permanency of contour and prevent the crowding together of the meshes overlying certain parts of the body, substantially as set forth.

10. A corset or body brace of curvilinear contour, made out of separate strands of wire fastened together so as to form meshes which lie in the planes of adaptation to the contour of the body, said meshes varying in size in different parts of the resulting fabric, substantially as set forth. 5

Dated this 16th day of August 1887.

M. J. ROBERTS.

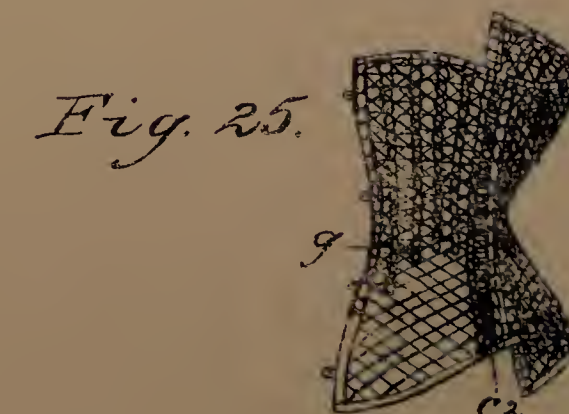
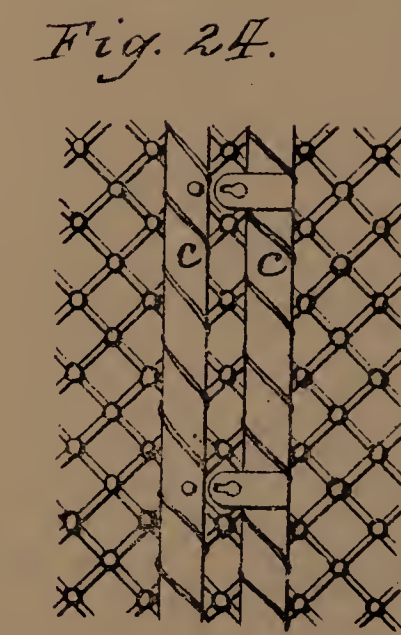
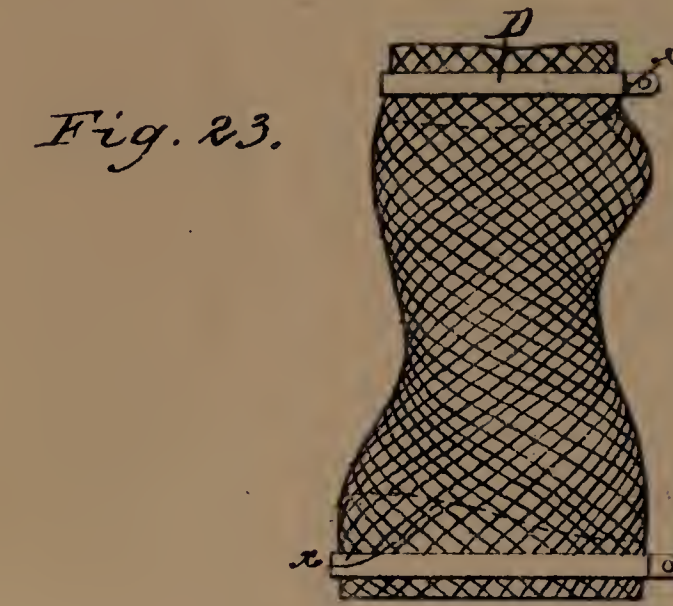
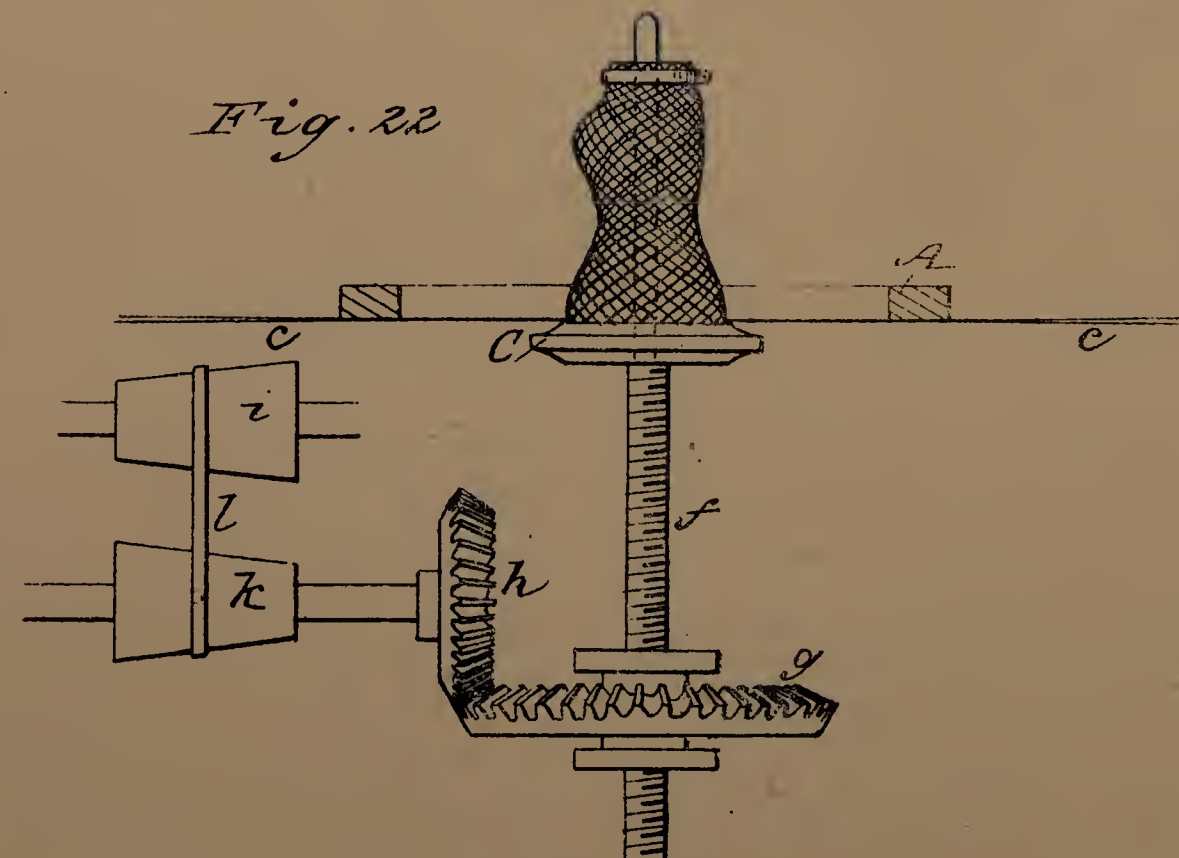
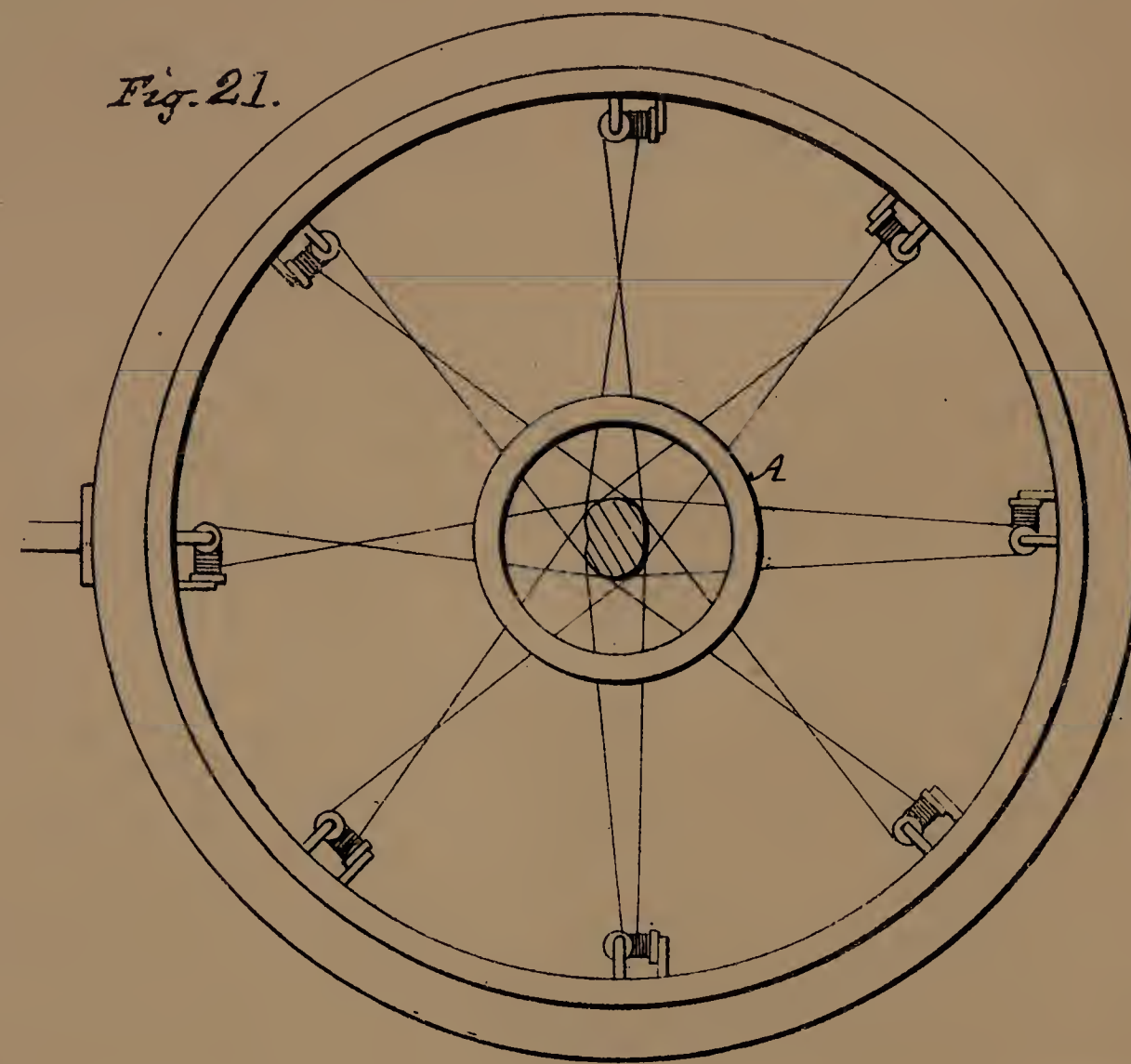
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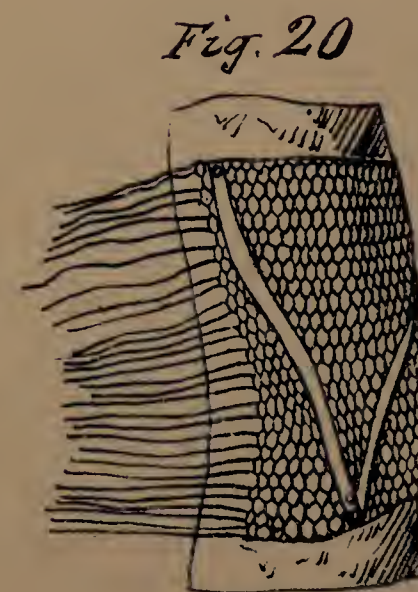
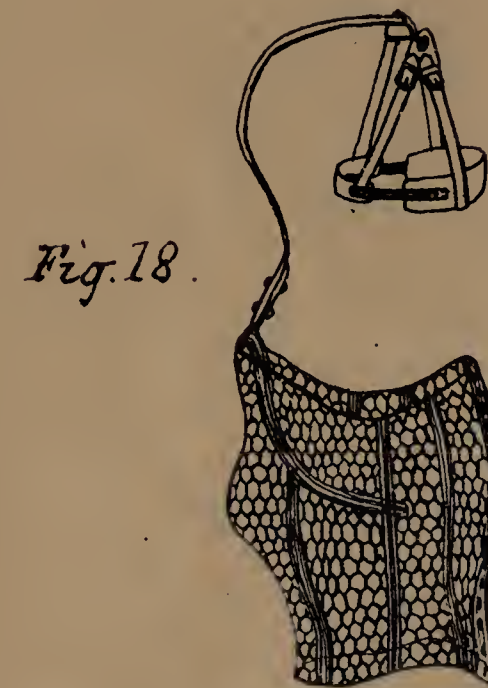
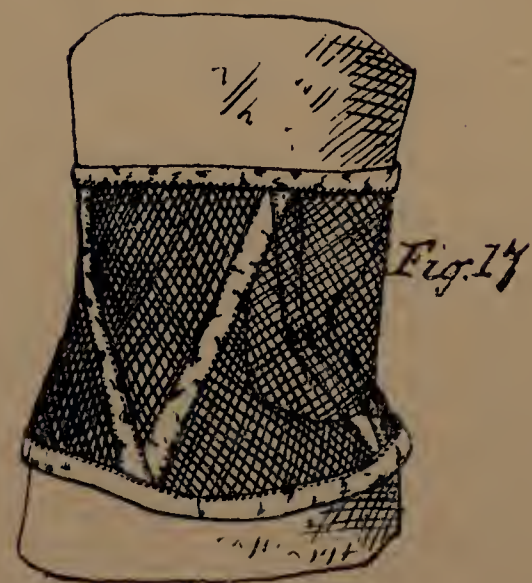
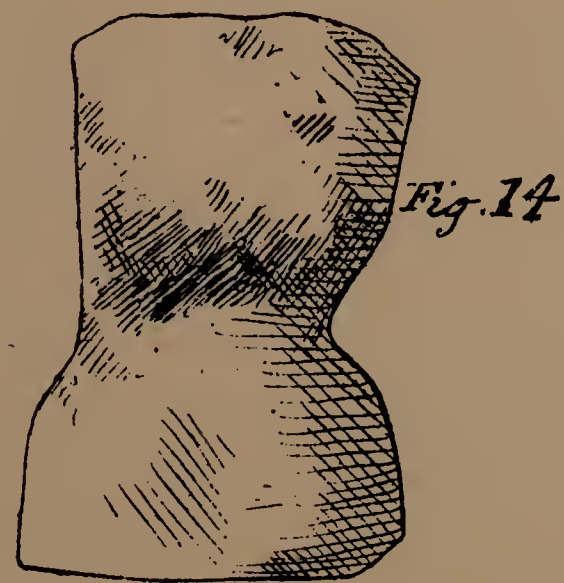
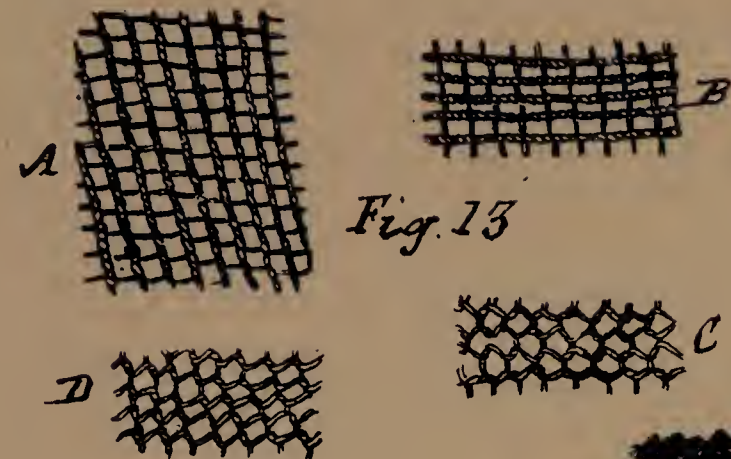
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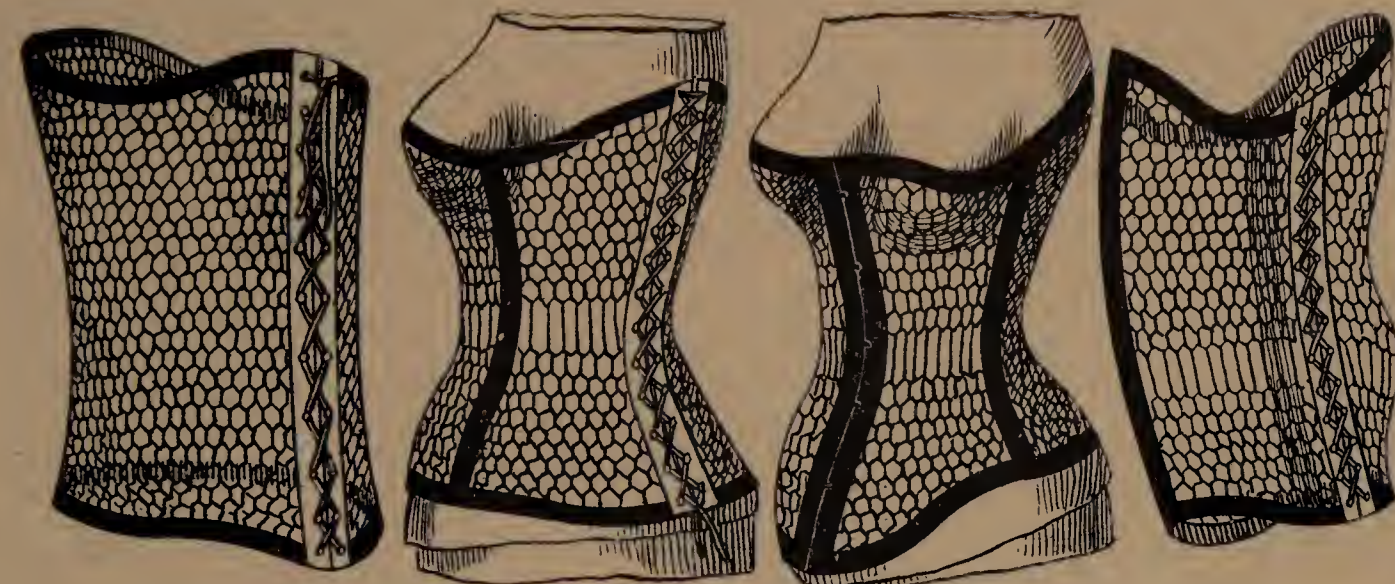


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

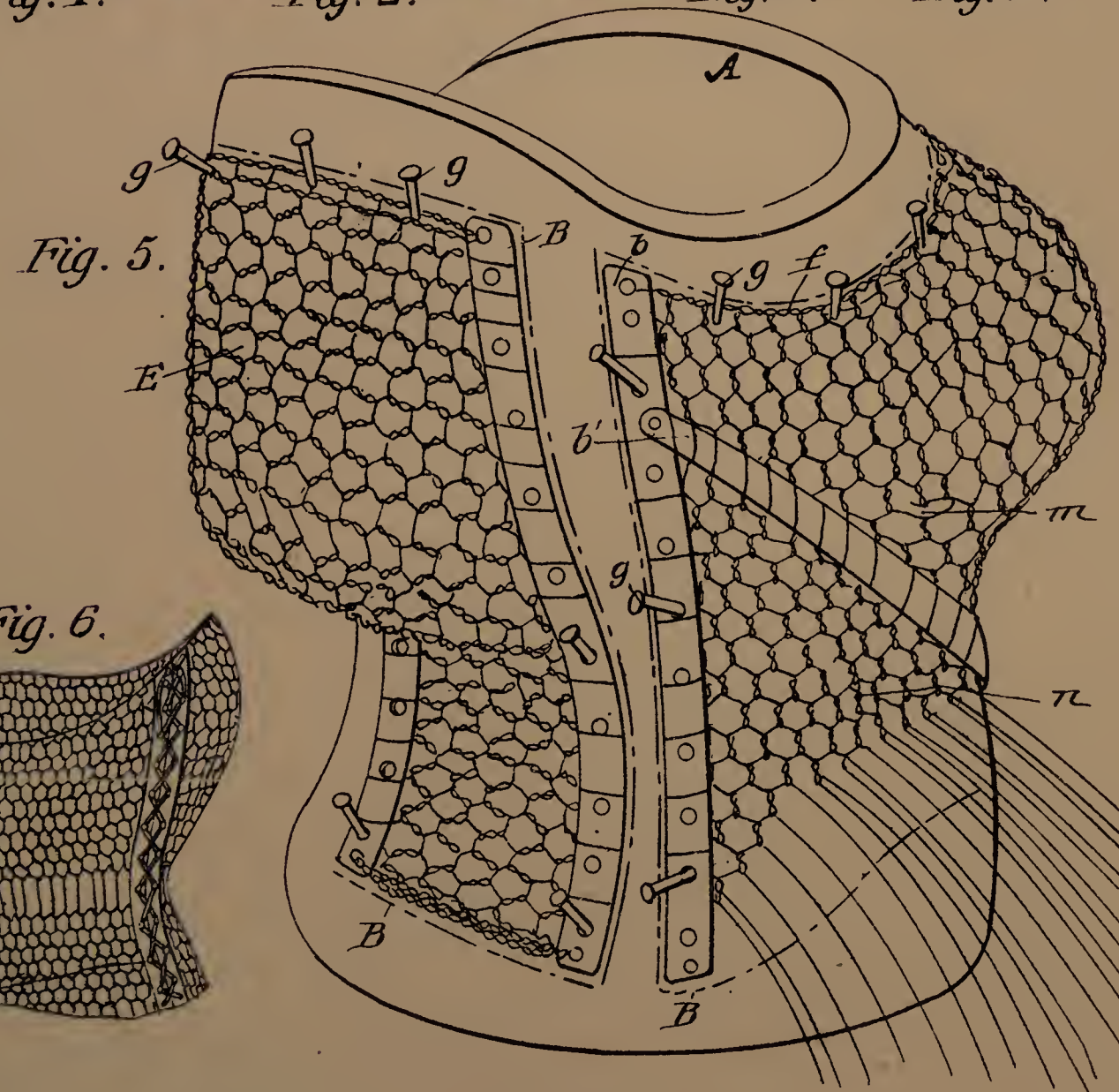


Fig. 5.

Fig. 6.

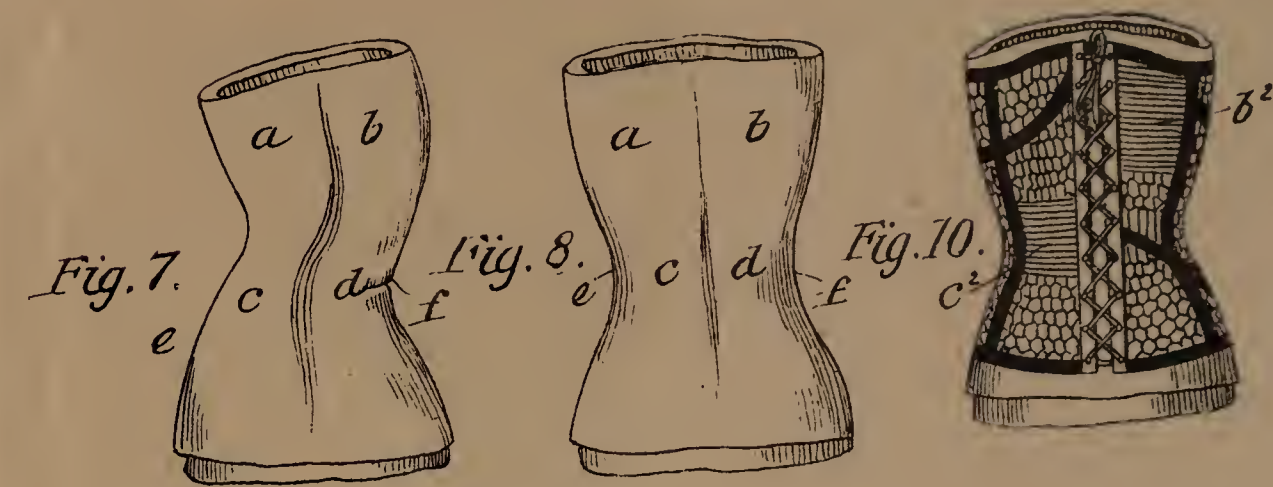


Fig. 7.

Fig. 8.

Fig. 10.

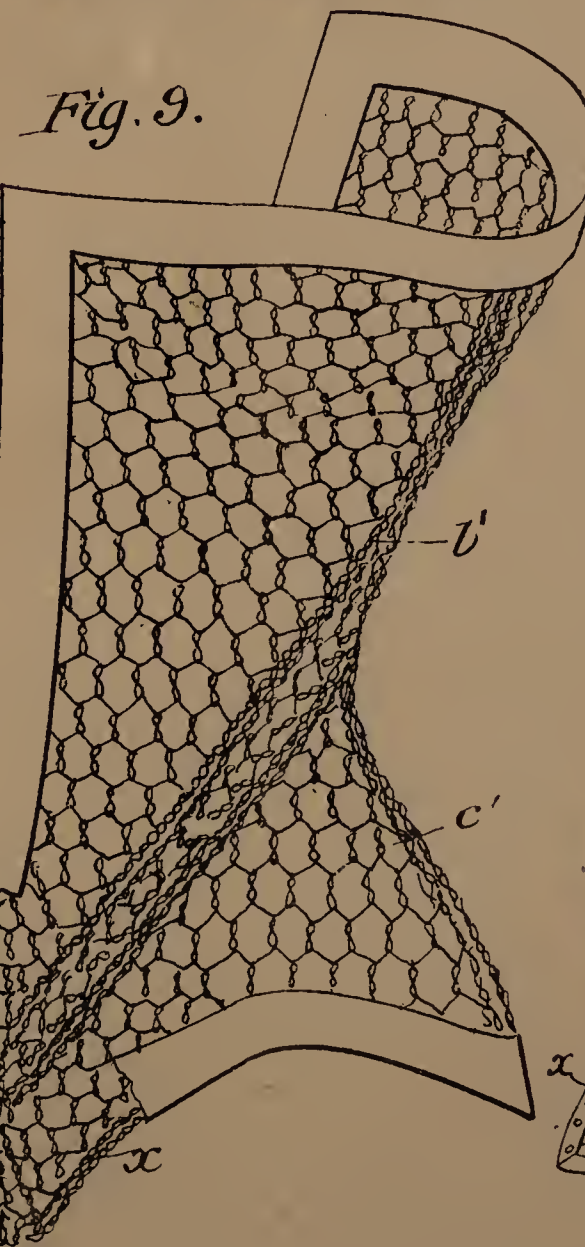


Fig. 9.

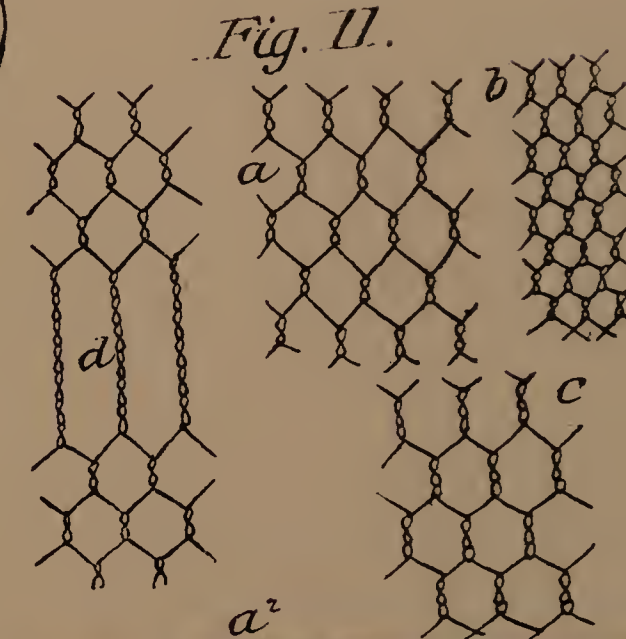


Fig. 11.



Fig. 12.

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